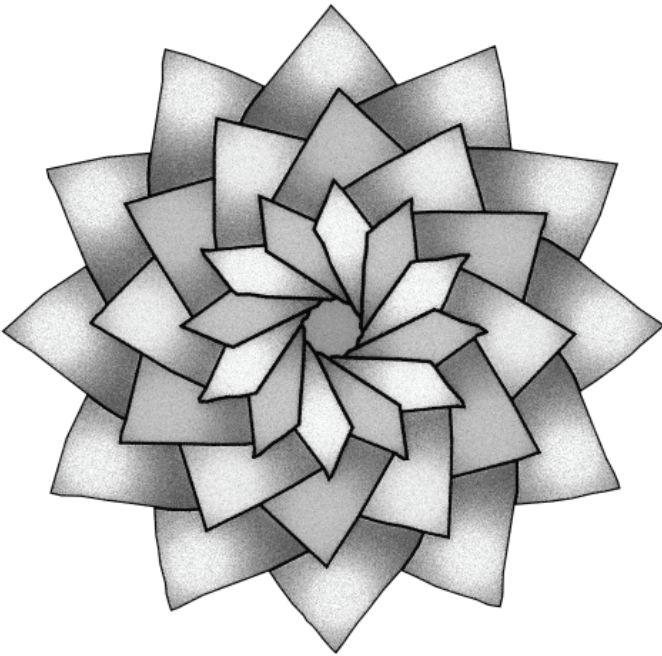# THE IMPERATIVE LIGHTS

MODEL #1

Origami Rose

INSTRUCTIONS FOR USE

SAFETY INFORMATION

Your Imperative Light is an electronic device, and like most other electronic devices, you should not get it wet or poke it with metal or expose it to extreme heat, cold, or gamma radiation.

Use only legitimate 5v USB power adapters that can supply at least 1 amp. Do not yank the power cord out recklessly or shove it in with too much force.

Your light is made from a hard plastic - if broken or cracked the edges could be sharp. Do not allow mischievous children to play with the light unsupervised.

SERIOUSLY - the plastic can be sharp! Please use caution around children.

ORIGAMI ROSE

Table of Contents

BASIC OPERATION

Thank you for purchasing an Imperative Light!

Your light is equipped with over a dozen custom light art programs, each with multiple palette options, as well an Advanced Mode where you can customize various program parameters.

To power your light, use the included USB cord and power adapter. Once the cord is plugged in, use the power switch on the right side of the light to turn the light on and off.

You may power the light with any 5V/1A USB port, such as a USB portable charger, computer USB port, or USB power adapter, as long as it provides 5 volts and at least 1 amp.
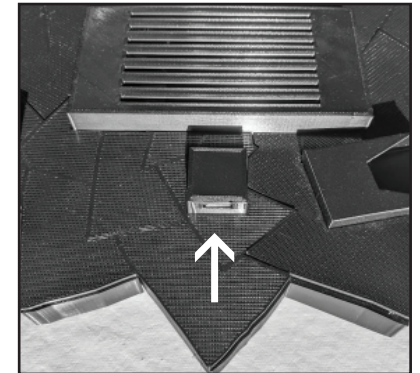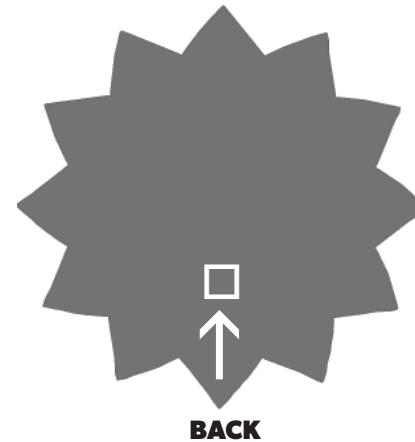
To control your light, use the included IR remote. (See page 4 for more details.)

If you have trouble getting the light to recognize commands, try standing closer and pointing the remote directly at the sensor. (Refer to page 29 for the sensor location.)

POWER SWITCH LOCATION

FRONT

USB PORT LOCATION

BACK
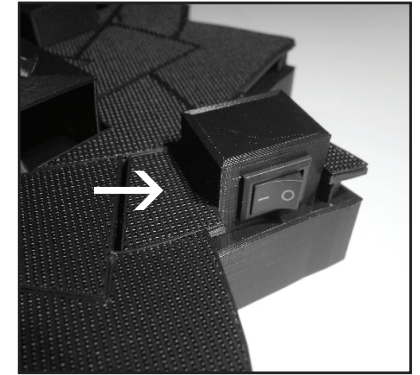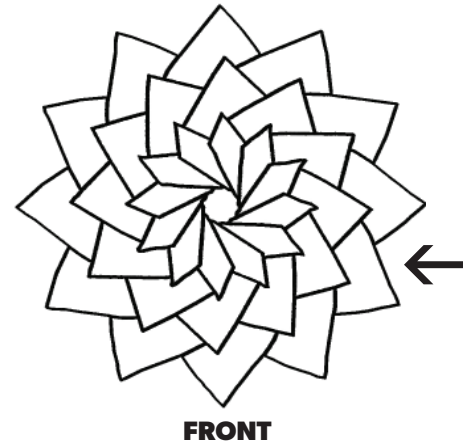
REMOTE CONTROL

Use the included infrared remote to control your light.

Press a number key to select a light art program.

The * key cycles through palette options.

The # key activates Advanced Mode. See program details for more info.

Up/down arrows change brightness.

Left/right arrows change hue.

The OK key sets hue/brightness to the default and resets the currently running program.

PROGRAM DIRECTORY

1 - Shimmer	2 - Pulse	3 - Twirl
4 - Color Pass	5 - Flip Actors	6 - Automata
7 - Sound React	8 - Clock	9 - Game
	0 - Showcase	

Select a program by pressing the related number key.
Press the same key multiple times to cycle through variants.

REMOTE HOLSTER LOCATION

FRONT
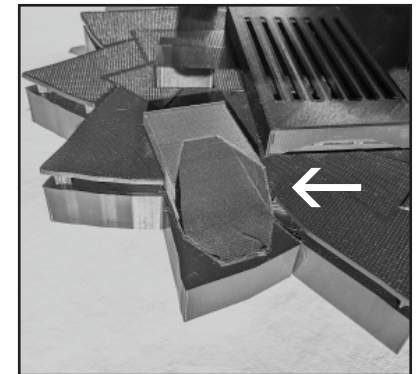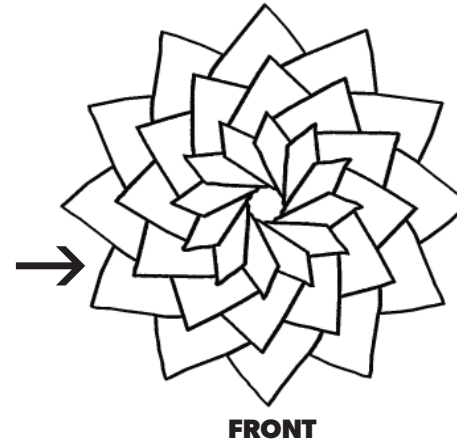
SHIMMER

A simple light program that shimmers like sunlight on the forest floor or like caustics at the bottom of a pool or like whatever other shimmery business you're most familiar with.

To activate Shimmer mode, press [1] on the remote.

To cycle through Shimmer variants, repeatedly press [1].

SHIMMER VARIANTS

Placid Shimmer

Two-Step Shimmer

Active Shimmer

SHIMMER PALETTES

Shimmer mode has eight (8) palette options. To cycle through palettes, press [*]

PLACID SHIMMER	TWO-STEP SHIMMER	ACTIVE SHIMMER
Summer Village	Summer Village	Summer Village
Lavender Lake	Lavender Lake	Lavender Lake
Ruby Red	Ruby Red	Ruby Red
RGB Rings	RGB Rings	RGB Rings
Neon Juice	Neon Juice	Neon Juice
June Bloom	June Bloom	June Bloom
Florescent Shock	Florescent Shock	Florescent Shock
Bright Star	Bright Star	Bright Star

ADVANCED SETTINGS

Completely optional. For those who want even more control!

To enter Advanced Mode, press [#]

To leave Advanced Mode, press [*]

While in Advanced Mode, use the number keys to select a parameter to edit, and then use the up/right and down/left keys to adjust that parameter.

SHIMMER PARAMETER LIST

#	PLACID SHIMMER	TWO-STEP SHIMMER	ACTIVE SHIMMER
1	Fade Speed	Fade Speed	Fade Speed
2	Fade Randomness	Fade Randomness	Fade Randomness
3	Hold Length	Hold Length	Hold Length
4	Hold Randomness	Hold Randomness	Hold Randomness
5	Hue Variation	Hue Variation	Hue Variation
6	Brightness Variation	Brightness Variation	Brightness Variation
7	[Not Used]	Animation Speed	Animation Speed
8	[Not Used]	Animation Random	Animation Random
9	[Not Used]	Animation Fade	Animation Fade
0	[Not Used]	[Not Used]	[Not Used]

Don't forget to press [*] when you are done editing parameters!

PULSE

Light programs that pulse outward like the ripples in your water glass when a T. Rex is nearby.

To activate Pulse mode, press [2] on the remote.

To cycle through Pulse variants, repeatedly press [2].

PULSE VARIANTS

Psychedelic Throb

Busy Ripples

Gentle Blending

PULSE PALETTES

Pulse mode has eight (8) palette options. To cycle through palettes, press [*]

PSYCHEDELIC THROB	BUSY RIPPLES	GENTLE BLENDING
Hypno-Pride	Primary Watercolors	Primary Watercolors
Light Tunnel	Swirling Dusk	Purple Bouquet
Ice Storm	Summer Field	Forest Canopy
Red Pulsar	Fall Foliage	Warm Neon
Halloween Portal	Ice Lightning	Electric Blue
July Fireworks	Twilight Park	Tasty Medicine
Summer Day	Roving Red	Spring Garden
Chaos Waves	July Picnic	Fall Foliage

ADVANCED SETTINGS

Play around with these parameters if you want to. No pressure!

To enter Advanced Mode, press [#]

To leave Advanced Mode, press [*]

While in Advanced Mode, use the number keys to select a parameter to edit, and then use the up/right and down/left keys to adjust that parameter.

PULSE PARAMETER LIST

#	PSYCHEDELIC THROB	BUSY RIPPLES	GENTLE BLENDING
1	Pulse Delay	Pulse Delay	Pulse Delay
2	Pulse Randomness	Pulse Randomness	Pulse Randomness
3	Background Fade	Background Fade	Background Fade
4	[Not Used]	Background Hold	Background Hold
5	[Not Used]	BG Hue Variation	BG Hue Variation
6	Pulse Hue Variation	Pulse 1 Hue Variation	Pulse 1 Hue Variation
7	Pulse Start Location	Pulse 2 Hue Variation	Pulse 2 Hue Variation
8	Pulse Fade	Pulse Fade	Pulse Fade
9	Pulse Hold	Pulse Hold	Pulse Hold
0	Pulse Speed	Pulse Speed	Pulse Speed

Don't forget to press [*] when you are done editing parameters!

TWIRL

Mix up your colors like they're in a washing machine, but one that washes colors in instead of out.

To activate Twirl mode, press [3] on the remote.

To cycle through Twirl variants, repeatedly press [3].

TWIRL VARIANTS

Crashing Wave

Jaunty Pinwheels

Digital Warp

TWIRL PALETTES

Twirl mode has eight (8) palette options. To cycle through palettes, press [*]

CRASHING WAVES	JAUNTY PINWHEELS	DIGITAL WARP
Seaside Village	Rainbow Wheels	RGB Phosphors
Plastic Fire	Warm Data	CMYK
Spring River	Spring River	Halloween Lights
Tumbling Plums	Tumbling Plums	Forest Map
Firetail	Firetails	Warm Cave
Asparagus Fields	Asparagus Fields	Party Zone
Rainbow Wheels	Basic Paints	Spring Garden
Candy Mints	Candy Mints	Fall Foliage

ADVANCED SETTINGS

You gotta admit you're at least a little curious about this, right?

To enter Advanced Mode, press [#]

To leave Advanced Mode, press [*]

While in Advanced Mode, use the number keys to select a parameter to edit, and then use the up/right and down/left keys to adjust that parameter.

TWIRL PARAMETER LIST

#	CRASHING WAVES	JAUNTY PINWHEELS	DIGITAL WARP
1	Ring 1 Speed	Ring 1 Speed	Min Speed
2	Ring 2 Speed	Ring 2 Speed	Max Speed
3	Ring 3 Speed	Ring 3 Speed	Pulse Fade
4	Ring Directions	Ring Directions	[Not Used]
5	Ring 1 Hue Shift	Ring 1 Hue Shift	Color 1 Hue Shift
6	Ring 2 Hue Shift	Ring 2 Hue Shift	Color 2 Hue Shift
7	Ring 3 Hue Shift	Ring 3 Hue Shift	Color 3 Hue Shift
8	[Not Used]	[Not Used]	Phase Duration
9	[Not Used]	[Not Used]	Pulse Gap
0	[Not Used]	[Not Used]	[Not Used]

Don't forget to press [*] when you are done editing parameters!

COLOR PASS

Color is meant to be shared! These programs all get that.

To activate Color Pass mode, press [4] on the remote.

To cycle through Color Pass variants, repeatedly press [4].

COLOR PASS VARIANTS

Safecracker

Color Drain

Ray Dance

COLOR PASS PALETTES

Color Pass mode has eight (8) palette options. To cycle palettes, press [*]

SAFECRACKER	COLOR DRAIN	RAY DANCE
Simple Colors	Everything Colors	Forest Sunbeams
Golden Summer	Marker Pack	Golden Sparkler
Ice Garden	Lost French Fries	Sea Breeze
Town Square	Antarctic Flowers	Fast Clouds
Freezer Party	Airline Logos	Whitecaps
Young Robot	Nostalgia	Disco Plum
Xmas Presents	Red Bits	Party Beams
Red Twist	The Usuals	Bubblegum Blue

VARIANT DETAILS

SAFECRACKER
In the first phase, color rays will shoot out from the center. After a random length of time, phase two will activate. During phase two, rings will be selected at random and rotated clockwise or counter-clockwise. After a length of time phase one will start again.

COLOR DRAIN
Each space will select a random color from the chosen palette. After a brief pause, all of the colors will drain counter-clockwise into the center, until the outermost color has filled the entire light.

RAY DANCE
Similar to phase one of Safecracker. Rays will fly out from the center of the light, as if you were traveling through a starfield at a very high speed.

ADVANCED SETTINGS

To enter Advanced Mode, press [#]. To leave, press [*].

COLOR PASS PARAMETER LIST

#	SAFECRACKER	COLOR DRAIN	RAY DANCE
1	Ray Delay Min	Initial Fade	Ray Delay Min
2	Ray Delay Max	Initial Hold	Ray Delay Max
3	Ray Speed	Pass Fade	Ray Speed
4	Twist Speed	Pass Hold	Background Fade
5	[Not Used]	Showcase Hold	Background Hold
6	Ray Fade	[Not Used]	Ray Fade In
7	Twist Fade	[Not Used]	Ray Hold
8	Rays Phase Duration	[Not Used]	Ray Fade Out
9	Twist Phase Duration	[Not Used]	Ray Hue Shift
0	[Not Used]	[Not Used]	[Not Used]

FLIP AGENTS

They crawl across the color fields, shifting things around to comply with their secret agendas. What do they want? More colors!!

To activate Flip Agents mode, press [5] on the remote.

To cycle through Flip Agents variants, repeatedly press [5].

FLIP AGENT VARIANTS

Solitary Agent

Flip Trio

Color Trails

FLIP AGENT PALETTES

Flip Agent mode has eight (8) palette options. To cycle through them, press [*]

SOLITARY AGENT	FLIP TRIO	COLOR TRAILS
RGB Rotations	RGB Rotations	Moving Phosphors
Confetti Cake	Confetti Cake	Confetti Trails
Forest Village	Forest Village	Forest Village
Discrete RGB	Discrete RGB	Discrete RGB
Confetti Village	Confetti Village	Confetti Village
Power Armor	Power Armor	Power Armor
Two-step Flip	Two-step Flip	Warm Blue / Cool Red
Eerie Void	Eerie Void	Phosphors Moving

VARIANT DETAILS

SOLITARY AGENT

The agent will stagger across the field at random time intervals, flipping each square to the next color as it leaves. Depending on the chosen palette, spaces will cycle between 2-4 colors.

FLIP TRIO

Similar to Solitary Agent except now there's three of them.

COLOR TRAILS

Once again we have three agents, but this time instead of cycling spaces, they will set each space they cross to their own color. These agents are very focused!

ADVANCED SETTINGS

To enter Advanced Mode, press [#]. To leave, press [*].

FLIP AGENTS PARAMETER LIST

#	SOLITARY AGENT	FLIP TRIO	COLOR TRAILS
1	Min Step Wait	Min Step Wait	Min Step Wait
2	Max Step Wait	Max Step Wait	Max Step Wait
3	Fade Length	Fade Length	Fade Length
4	Hold Duration	Hold Duration	Hold Duration
5	Agent Blink Speed	Agent Blink Speed	Agent Blink Speed

*Parameters 6-9 and 0 are unused for Flip Agents.

AUTOMATA

A selection of cellular automata simulations. That's what people always want in their lamps, right?

To activate Automata mode, press [6] on the remote.

To cycle through Automata variants, repeatedly press [6].

AUTOMATA VARIANTS

Natural Selection

Game of Life

Wolfram Rules

AUTOMATA PALETTES

Automata mode has eight (8) palette options. To cycle through them, press [*]

NATURAL SELECTION	GAME OF LIFE	WOLFRAM RULES
Festival Contest	Jungle Dance	Sour Medicine
Tropical Airport	Autumn Lagoon	Calculator Red
Seaside Cottage	Candy Cane	Ice Floes
Spicy Candy	Archipelago	Flashlight Fragments
Turbulent Tidepool	Sour Medicine	Jungle Dance
Everyone's Invited	Calculator Red	Autumn Lagoon
Simplicity	Ice Floes	Candy Cane
Toy Blocks	Flashlight Fragments	Archipelago

VARIANT DETAILS

NATURAL SELECTION

Colors are choosen at random and assigned a strength. Each turn each cell picks a neighbor at random, and if it is weaker it will adopt the color of the stronger. Once one color has claimed the entire board, the simulation will be restarted with new strengths assigned to the colors.

GAME OF LIFE

Cells are randomly chosen as living or dead. Each turn, living cells will go on living if they have one or two neighbors, otherwise they will die. Any dead cell that is surrounded by exactly three living cells will spring to life, as if through reproduction.

Usually the colony of cells will die out, given the limited space in this model, and a new simulation will be started. However sometimes you will get an "Oscillator" - a pattern of cells that will alternate back and forth forever. In this case you will need to hit the 'OK' button to restart the simulation, and marvel at the wonders of mathematics!

WOLFRAM RULES

Cells are randomly chosen as on or off. Each turn a cell's new status is determined by the previous status of itself and its two immediate neighbors. (For this variant, pretend the cells are a strand of lights that spiral out from the center. Because in reality that's what they are.) The table of rules that determine whether to turn off or on for each set of three previous states, (left, self, right,) can be assigned an 8-bit number. The ones used here are Wolfram Rule 30 and Wolfram Rule 110.

ADVANCED SETTINGS

AUTOMATA PARAMETER LIST

#	NATURAL SELECTION	GAME OF LIFE	WOLFRAM RULES
1	Step Length	Step Length	Step Length
2	[Not Used]	Step Randomness	Step Randomness
3	Fade Length	Fade Length	Fade Length
4	Hold Duration	Hold Duration	Hold Duration
5	Hue Shift	Hue Shift	Hue Shift

*Parameters 6-9 and 0 are unused for Automata.

SOUND REACT

Light and sound, together at last! Why didn't anyone else think of this before??

To activate Sound React mode, press [7] on the remote.

To cycle through Sound React variants, repeatedly press [7].

Note: Due to hardware limitations, the remote will be less responsive while in Sound React mode. You might need to stand closer to the lamp for it to work.

SOUND REACT VARIANTS

React Rings

Dazzle Dance

Full Spectrum

REACT RINGS	DAZZLE DANCE	FULL SPECTRUM
Fruity Juice	Fruity Juice	Fruity Juice
Summer Bloom	Summer Bloom	Summer Bloom
Funky Circus	Funky Circus	Funky Circus
Pale Rose	Pale Rose	Pale Rose
Summer Village	Summer Village	Summer Village
Lavender Lake	Lavender Lake	Lavender Lake
Ruby Red	Ruby Red	Ruby Red
RGB Rings	RGB Rings	RGB Rings

VARIANT DETAILS

REACT RINGS

Each ring will flash in response to sound - the outer ring will respond to high frequences, while the inner rings respond to lower frequencies.

DAZZLE DANCE

Similar to React Rings, except the low, mid, and high frequencies each respond to two different nearby frequencies for greater detail.

FULL SPECTRUM

The most detail! Each cell tracks its own frequency, with the lowest sounds near the center and the highest pitches on the outer ring. See the shapes of sounds!

ADVANCED SETTINGS

SOUND REACT PARAMETER LIST

#	REACT RINGS	DAZZLE DANCE	FULL SPECTRUM
1	BG Fade Duration	BG Fade Duration	BG Fade Duration
2	Bass Frequency	Bass Frequency	[Not Used]
3	Bin Size	Bin Size	[Not Used]
4	Alpha Minimum	Alpha Minimum	Alpha Minimum
5	Dropoff Speed	Dropoff Speed	Dropoff Speed
6	Trigger Threshold	Trigger Threshold	Trigger Threshold
7	Sound Profile Amount	Sound Profile Amount	Sound Profile Amount
8	[Not Used]	[Not Used]	[Not Used]
9	[Not Used]	[Not Used]	[Not Used]

CLOCK

A clock! It tells the time! After you tell -it- what the time is. So more like it keeps track of relative time. Does absolute time even really exist? I don't know, this all seems beyond the scope of this user manual.

To activate Clock mode, press [8] on the remote.
To cycle through Clock variants, repeatedly press [8].

CLOCK VARIANTS
Spin
Shimmer
Pulse

CLOCK PALETTES
Clock mode has eight (8) palette options. To cycle through them, press [*]

SPIN	SHIMMER	PULSE
Seaside Village	Lavender Lake	Ice Storm
Plastic Fire	Ruby Red	Red Pulsar
Spring River	RGB Rings	Halloween Portal
Tumbling Plums	Test Pattern	July Fireworks
Firetail	Summer Bloom	Summer Day
Asparagus Fields	Fast Food	Chaos Waves
Rainbow Wheels	Bright Star	Hypno-Pride
Candy Mints	Summer Sundial	Light Tunnel

ADVANCED SETTINGS

To enter Advanced Mode, press [#]. To leave, press [*].

Advanced Mode works differently for the Clock program.

Use the Up/Down arrow keys to select hour/minute/second.
Use the Left/Right arrow keys to adjust the selected setting.

You will need to reset the time if the light is powered off. However you can switch between programs and the time will continue to be tracked.

Don't forget to press [*] when you are done editing parameters!

GAME

That's right - your light includes a game for 2-4 players! Who will be the world champion? I don't know, I'm not keeping track. Let's just say it's you!

To activate Game mode, press [9] on the remote.

You will need to be in Advanced Mode to control the game - see page 21 for more details.

The object of the game is to capture the most territory with your color. Move the cursor representing your color to an empty space and press OK to flip the space along with surrounding spaces to your color. You may also re-capture one of your own spaces, in order to flip the spaces around it. Sometimes this can be a useful move!

Once all spaces have been filled with a color, the game will end and the board will fill up with the color of the winning team.

HOW TO PLAY THE GAME

How to play it -well- is up to you!

To control the game, you *must* be in Advanced Mode.

To enter Advanced Mode, press [#]
To leave Advanced Mode, press [*]

Use the Up/Down arrow keys to move between rings.
Use the Left/Right arrow keys to move around the current ring.

Press the OK key to flip a space and the spaces around it to your color. Control will automatically advance to the next player.

Press the [2], [3], or [4] keys to start a new game with that number of players.

Don't forget to press [*] when you are done playing the game!

SHOWCASE

Sit back and let your light make all the decisions for you.

To activate Showcase mode, press [0] on the remote.

To cycle through Showcase variants, repeatedly press [0].

If you like the pattern currently being displayed, pressing [OK] will pause Showcase mode and stop it from changing.

Pressing [OK] again will resume Showcase mode and immediately jump to a new program.

SHOWCASE VARIANTS

Highlights

Sequential

Monochrome

VARIANT DETAILS

HIGHLIGHTS

Every 30 seconds a program will be randomly selected from the first six - Shimmer, Pulse, Twirl, Color Pass, Flip Agents, Automata - and then a random variant and pattern will be selected as well.

Your light will always start in this mode when it is powered on.

SEQUENTIAL

Every minute the next program/variant from the list of the first six programs and their variants will be loaded, and a random pattern will be applied.

MONOCHROME

Every minute a new program will be randomly selected from a list of (mostly) monochromatic program variants and patterns. Use this mode and then shift the hue when you want one particular color, but also want variety and action!

F.A.Q.

Fervently Answering Queries

HOW DO I UPGRADE MY LIGHT?

The controller unit in your light is modular, and upgrades may be available in the future. To upgrade your light's controller, remove the protective cage from the back by carefully pressing the bottom side of the cage in till the tabs clear the backplate. Then disconnect the 3-wire light connector and 4-wire IR connector by pressing the release catch and gently pulling them apart. (Wiggle a little if necessary, just take care to not yank the wires out of the connectors!)

Then take the replacement controller box and connect the 3-wire light cable and 4-wire IR cables. They will only fit one way - do not try to force the connections! Once connected, replace the protective cage by inserting the top tabs underneath the light's backplate, and then pushing in the bottom of the cage till it clears the other side of the backplate.

You may disassemble the old controller box and reuse the Raspberry Pico inside for your own projects. They are a great way to learn microcomputing!

CAN I DESIGN MY OWN CUSTOM LIGHT PROGRAMS?

Not yet, but hopefully in the future! A bluetooth/WiFi upgrade unit is in the works, which will offer light program editing and creation abilities. In the meantime, experiment with the Advanced Settings for each program, and you will find there is a fair amount of flexibility to play with!

IS THE LIGHT BRIGHT ENOUGH TO READ BY?

Most likely no, this light is intended as wall/desk art, not as a functional light source that one could read by. USB connections are very convenient, but are not designed for large amounts of current. If you need a light with more oomph, check The Imperative store for lamps that use DC power instead of USB - these are capable of more brightness than USB-powered lights.

CAN I SEND YOU MY THOUGHTS ON THINGS?

Visit lights.theimperative.studio/contact to send us a message!

TROUBLESHOOTING

What to do when it all goes wrong

MY LIGHT WON'T TURN ON!

- Ensure the USB power cable is firmly inserted into your light, and that the other end is plugged into a USB power outlet supplying 5V and at least 1A.

- Make sure the power switch on the right side of the light is flipped to the "On" position. (The straight line, not the circle.)

- Turn your light off and on again, to reset the settings and ensure the brightness is at max.

THE REMOTE ISN'T WORKING!

- Stand closer to the light, and aim the remote at the sensor location. (Location is provided on page 29.)

- Press the [*] button a few times to ensure you're not still in Advanced Mode.

- Replace the battery in the remote with a fresh CR2032 battery.

THE LIGHTS ARE BEHAVING STRANGELY!

- Turn the light off and back on again, to clear out any advanced settings and return the light to the default Showcase mode.

THE LIGHT SEEMS FROZEN!

- Press the "OK" button on the remote to reset the current program.

- Turn the light off and back on again.

THE LIGHT SEEMS VERY DIM!

- Press the "OK" button on the remote to reset the current program and set brightness back to the maximum.

- Ensure your power adapter can supply at least 1 amp.

MY PROBLEM ISN'T LISTED HERE!

- Visit lights.theimperative.studio/support to send a support request

SPECS

It's good to be informed.

NUMBER OF LEDS
37 WS2812B LEDs

PROCESSING UNIT
Raspberry Pi Pico RP2040

PLASTIC TYPE
PLA+

POWER REQUIREMENTS
5 volts
1 amp minimum

ON-BOARD SOFTWARE
LUMIC PicoOS v1.0

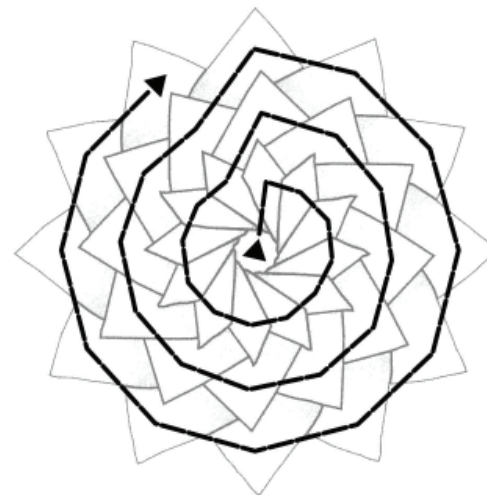**LIGHT PROGRAM LANGUAGE**
LUMIC Programing Language (LPL) v4.2
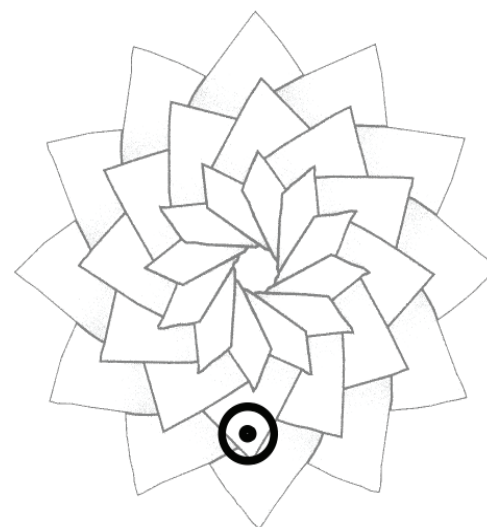
MICROPHONE SENSOR
Max9814

INFRARED PROTOCOL
HX1838

LIGHT ORDER

IR SENSOR LOCATION

Scan this link for an online version of these instructions.

For more information about The Imperative visit:
https://theimperative.studio

Thank you for using an Imperative Light!